Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original): A fluidic nanotube, comprising:

a tubular member having first and second ends, and an inner bore between said first and second ends;

said tubular member having a non-porous inner wall;

said tubular member comprising a non-carbon, hydrophilic material;

wherein said nanotube is a functional component of a device selected from the group of devices consisting essentially of nanocapillary devices, field effect transistors, nanoelectrophoretic devices, detectors, DNA sequence detectors, immunosensors, tube-field-effect transistors, microfluidic wafers, nanocapillary wafers, electrode wafers, MEMS switching chips, transistors, sensors, thermoelectric devices, photonic devices, nanoelectromechanical actuators, nanoelectromechanical sensors, nanoscale fluidic bioseparators, and imaging devices.

Claims 2-4 (canceled)

5. (currently amended): A nanotube as recited in claim 1, ~~2, 3, or 4,~~ wherein said nanotube is formed by the steps comprising:

forming a core material;

depositing a nanotube material over said core material; and

removing said core material.

6. (original): A nanotube as recited in claim 5, wherein said core material is sacrificed during said removal step.

7. (original): A nanotube as recited in claim 5, wherein said core material comprises a sacrificial template for said nanotube.

8. (original): A nanotube as recited in claim 5:

wherein said core material has ends and a side surface; and

wherein said nanotube material is deposited on said side surface to form a cylindrical sheath through which said core material extends.

9. (original): A nanotube as recited in claim 5, wherein said core material is single-crystalline.

10. (original): A nanotube as recited in claim 5, wherein said nanotube material is single-crystalline.

11. (original): A nanotube as recited in claim 5, wherein said core material comprises a material selected from the group of materials consisting essentially of zinc oxide (ZnO), silicon (Si), gallium nitride (GaN), germanium (Ge), silver (Ag), gold (Au), group II-VI materials, group III-V materials, elemental group IV materials, and metals.

12. (original): A nanotube as recited in claim 11, wherein said nanotube material comprises a material selected from the group of materials consisting essentially of GaN, Si, GaAs, CdSe, GaP, InP, Ge, InAs, Group II, III, IV, V, and VI materials including quaternaries and tertiaries, as well as oxides, SiO, GaO, InO and other insulating materials, elemental metals, and polymers.

13. (original): A nanotube as recited in claim 12, wherein the material selected for said nanotube material has a sufficiently similar crystalline structure and lattice constant as the material selected for said core material to allow epitaxial growth of said nanotube material on said core material.

14. (currently amended): A nanotube as recited in claim 1, ~~2, 3 or 4,~~ wherein said tubular member comprises a single longitudinal segment.

15. (currently amended): A nanotube as recited in claim 1, ~~2, 3 or 4,~~ wherein said tubular member comprises multiple longitudinal segments.

Claims 16-56 (canceled)

57. (original): A tubular field effect transistor (TFET), comprising:
at least one semiconducting nanotube;
a reservoir fluidly coupled to each end of said nanotube;
a source electrode attached to a first end of said nanotube; and
a drain electrode attached to a second end of said nanotube;
wherein the passage of molecular species through said nanotube changes source to drain current flow.

58. (original): A transistor as recited in claim 57, further comprising capture molecules retained within said nanotube for capturing or slowing select molecular species.

59. (original): A transistor as recited in claim 57, further comprising a gate electrode attached toward the center of said nanotube for controlling ion transport through said nanotube.

60. (original): A transistor as recited in claim 57, wherein said tubular field effect transistor is a functional component of a device selected from the group of devices consisting essentially of nanocapillary devices, field effect transistors, nanoelectrophoretic devices, detectors, DNA sequence detectors, immunosensors, tube-field-effect transistors, sensors, thermoelectric devices, photonic devices, nanoelectromechanical actuators, nanoelectromechanical sensors, nanoscale fluidic bioseparators, and imaging devices.

Claims 61-68 (canceled)

69. (original): A nanocapillary electrophoresis device, comprising:

at least one hydrophilic nanotube;

a plurality of capture molecules retained within said nanotube for capturing or slowing selected molecular species;

a reservoir fluidly coupled to each end of said nanotube;

a source electrode coupled proximal a first end of said nanotube; and

a drain electrode coupled proximal a second end of said nanotube;

wherein the passage of molecular species through said nanotube changes ionic current flow.

70. (original): A device as recited in claim 69, further comprising:

an optical single-molecule detection and identification system configured for generating an optical detection signal in response to molecules passing through said nanotube; and

a coincidence circuit configured to generate coincident molecule detection signal in response to the coincidence between said ionic current flow and said optical detection signal;

whereby the use of coincident detection increases false positive immunity.

71. (original): A device as recited in claim 69, wherein said electrophoretic device is a functional component of a device selected from the group of devices consisting essentially of nanocapillary devices, nanoelectrophoretic devices, detectors, DNA sequence detectors, immunosensors, sensors, thermoelectric devices, photonic devices, nanoelectromechanical actuators, nanoelectromechanical sensors, nanoscale fluidic bioseparators, and imaging devices.

72. (original): A nanocapillary electrophoresis array technology (NEAT) device, comprising:

a hydrophilic nanotube;

a plurality of capture molecules retained within said nanotube for capturing or slowing selected molecular species;

a reservoir fluidly coupled to each end of said nanotube;

a source electrode coupled proximal a first end of said nanotube;

a drain electrode coupled proximal a second end of said nanotube;

wherein the passage of molecular species through said nanotube changes ionic current flow;

wherein the above structures comprise an electrophoresis cell;

an array of said electrophoresis cells; and

means for detecting the current from each of said electrophoresis cells.

73. (original): A device as recited in claim 71, wherein said electrophoretic device is a functional component of a device selected from the group of devices consisting essentially of nanocapillary devices, nanoelectrophoretic devices, detectors, DNA sequence detectors, immunosensors, sensors, thermoelectric devices, photonic devices, nanoelectromechanical actuators, nanoelectromechanical sensors, nanoscale fluidic bioseparators, and imaging devices.

74. (original): A device as recited in claim 71, wherein said detecting means comprises:

a plurality of switching elements configured for selecting one or more of the electrophoresis cells in said array; and

a circuit for conditioning the signals received from each said electrophoresis cell.

75. (original): A device as recited in claim 74, wherein said plurality of switching elements have a row and column arrangement for accessing cells within a two-dimensional array of said electrophoresis cells.

76. (original): A device as recited in claim 74, wherein said switching elements have an off-state leakage current which is less than approximately 5 pA per 1 μm of gate length for $V_{ds} \approx$ 2.2 Volts.

77. (original): A device as recited in claim 76, wherein each of said switching elements comprises a micro-electromechanical systems (MEMs) switch using switch contacts which are separated by an air-gap in the off-state and bridge the air-gap to establish a connection when in the on-state.

78. (original): A device as recited in claim 77, wherein said MEMs switching elements comprises:

multiple signal contacts;

an activation contact; and

a flexible conductive beam configured for deflection toward said activation contact in response to an activation voltage potential, wherein during said deflection said flexible conductive beams makes contact with said multiple signal contacts establishing a conduction path between the multiple signal contacts.

79. (original): A device as recited in claim 78, further comprising insulation disposed between said activation contact and said flexible conductive beam so that a conduction path is not established between said activation contact and said flexible conductive beam in response to deflection of said flexible conductive beam.

Claims 80-99 (canceled)

100. (original): A semiconductor device, comprising:

a nanotube formed from a plurality of longitudinal segments and sheaths of alternatively doped semiconductor material; and

a plurality of electrical contacts coupled to said alternatively doped longitudinal segments and/or sheaths for establishing electrical connection to said device.

101. (original): A semiconductor device as recited in claim 100, wherein said semiconductor device is selected from the group of semiconductor devices consisting essentially of diodes, light emitters, light detectors, electron transport devices, bipolar transistors, FETs, insulated gate FETs, and combinations thereof.

102. (original): A semiconductor device as recited in claim 100, wherein said alternatively doped longitudinal segments and sheaths are doped with different doping species and/or at different doping levels.

103. (original): A semiconductor device as recited in claim 100, wherein at least two alternatively doped of said longitudinal segments and/or sheaths form a p-n or n-p junction.

104. (original): A semiconductor device as recited in claim 100, wherein at said alternatively doped of said longitudinal segments and/or sheaths form a p-n-p or n-p-n junction.

105. (original): A semiconductor device as recited in claim 100, further comprising an insulating segment or sheath between at least two said longitudinal segments and/or sheaths of alternatively doped semiconductor material.

106. (original): A semiconductor device as recited in claim 105, wherein at least two of alternatively doped of said longitudinal segments and/or sheaths form a p-i, i-p, n-i, or i-n junction.

107. (original): A semiconductor device as recited in claim 105, wherein alternatively doped of said longitudinal segments and/or sheaths form a p-i-n, n-i-p, n-i-n, or p-i-p junction.

108. (original): A semiconductor device as recited in claim 100, wherein said longitudinal segments and sheaths of semiconductor material are formed about a nanowire core which is later removed.

109. (original): A semiconductor device as recited in claim 100, wherein at least one said electrical contact is within the core of said longitudinal segments.